The impact of business intelligence on organization's effectiveness: an empirical study

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Abstract

Purpose
The purpose of this study was to identify the influence of organizational strategy, structure, process and culture on organizational effectiveness and the possible mediating role of business intelligence (BI) systems among them.
Design/methodology/approach
Sample data for this study were collected from 225 organizational units in Bangladesh and analyzed using the Partial Least Squares (PLS) method, a statistical analysis technique based on the Structural Equation Modelling (SEM).
Findings
The results revealed that organizational factors, such as organizational strategy, structure, process, and culture positively affect both BI systems' effectiveness and organizational effectiveness. Furthermore, BI systems' effectiveness partially mediates the impact of organizational strategy, structure, process and culture on organizational effectiveness.
Originality/Value
BI systems are context-specific and can influence organizational effectiveness. Dearth in research on the influence of organizational factors to BI systems motivates this study to contribute in BI systems literature by proposing a theoretical model and investigating the mediating role of BI systems among various organizational factors and organizational effectiveness.

Keywords: Business Intelligence systems, Organizational strategy, Organizational culture, Organizational structure, Organizational process, organizational effectiveness.

Introduction

In today's changing business environment, Business Intelligence (BI) systems play critical role in organizations to support decision-making and improve organizational performance (Ramakrishnan et al., 2012). These systems facilitate firms to store, retrieve, and analyze large amounts of information about their operations and allow them to improve strategic and tactical decisions, and gain competitive advantage of the industry (Jones, 2005; Davis, 2002). Zeng et al. (2006) defined BI as "the process of collection, treatment and diffusion of information that has an objective, and the reduction of uncertainty in the making of all strategic decisions." It is a set of concepts, processes and methods to improve business decisions, which use information from multiple sources (i.e. internal as well as externally supplied by customers, partners, or third parties) to understand business dynamics (Maria, 2005). Elbashir et al. (2008) used the term as business intelligence to refer to a group of systems for data analysis and reporting, which helps top, middle and lower level managers to use relevant and timely information to make better decisions.

Over the past decades, BI has become increasingly important in both the business communities and the academia (Chen et al., 2012). Many researchers found that BI systems yield real business benefits and it is used by decision makers throughout the firm for effective decision making across a broad range of business activities (Chau and Xu, 2012; Ranjan, 2009; Sahay and Ranjan, 2008). It is the input to strategic and tactical decisions at senior management level and it helps individuals to do their day-to-day jobs at lower management level (Negash, 2004). A recent study suggested that using a BI system is the way of improving business performance by providing actionable information for executive decision makers to make better decisions (Cui et al., 2007). It has been argued that BI is "both a process and a product." The process is composed of methods that firms use to develop useful information and intelligence that can help to survive

and succeed in the global economy. The product is information that will help firms to predict the behavior of their "customers, suppliers, competitors, products and services, markets, and the general business environment" with a degree of certainty (Wixom and Watson, 2010; Vedder et al., 1999).

Recently, most research in business intelligence emphasized the use of BI in organizations. The IBM Tech Trends Report based on a survey of over 4,000 IT professionals from 93 countries and 25 industries, identified BI and business analytics as one of the four major technologies in organizations (IBM, 2011). In an annual survey of IT executives, BI topped the list of the most important applications and technology developments (Luftman and Ben-Zvi, 2010). Bloomberg Businessweek (2011) revealed that 97 percent of firms with yearly turnover exceeding $100 million were found to use some form of BI. Moreover, McKinsey Global Institute predicted that a 50 to 60 percent gap between the supply and demand of persons with business analytical skill, as well as a shortfall of 1.5 million data-savvy managers with the know-how to analyze data to make effective decisions by 2018 (Manyika et al., 2011).

In recent years, BI is continued to be a top priority for many firms, and the promises of BI are rapidly attracting many more champions (Evelson et al., 2007). BI systems are broadly adopted or in process to be adopted in organizations today, supporting activities such as managerial decision making, data analysis, and business-performance measurement. Currently, many organizations have been investing billions of dollars to implement BI systems to accomplish the task (Anjariny and Zeki, 2011). BI has permeated various industries including banking, insurance, finance, retail, healthcare, telecommunications, and manufacturing (Olszak and Ziemba, 2006). It has been applied to many areas that are related to the management processes and some of them have formed their own systems with specific characteristics (Li et al., 2008).

However, in practice, ineffectiveness of BI is common in organizations, especially in the context of developing countries. Organizations are facing difficulties in implementing BI. Although BI has been already studied from technological perspectives, some organizations in developing countries still fail to achieve the success with BI applications (Jourdan et al., 2008). This may be because the relationship between organizational factors such as organizational strategy, organizational structure, organizational process, organizational culture, and BI systems has remained largely unexamined. It is essential to examine the relationship between organizational factors and BI systems' effectiveness because the primary objective of BI is to support decision making in organizations. It is also essential to examine the relationship between BI and organizational effectiveness. Therefore, this study attempts to address the following research questions: (1) What is the relationship between organizational factors and BI systems effectiveness? (2) What is the relationship between BI systems and organizational effectiveness? (3) Does a BI system mediate the relationship between organizational factors and organizational effectiveness?

The rest of the paper is organized as follows. Theoretical framework is presented in Section 2. Section 3 explains the research methodology. The research findings are presented in Section 4 followed by discussion in Section 5. Implications are discussed in Section 6 while, limitations and future direction are presented in Section 7. Finally, Section 8 concludes the paper.

Theoretical Framework

The objective of this study is to investigate the impact of business intelligence on organizational effectiveness. In the literature, the related studies suggest that the types of organizational factors in business intelligence applications in an organizational setting are organizational strategy, organizational culture, organizational process, and organizational structure. The theoretical

model is presented in Figure 1. We will look at the theoretical model for each of the hypotheses in the following subsections.

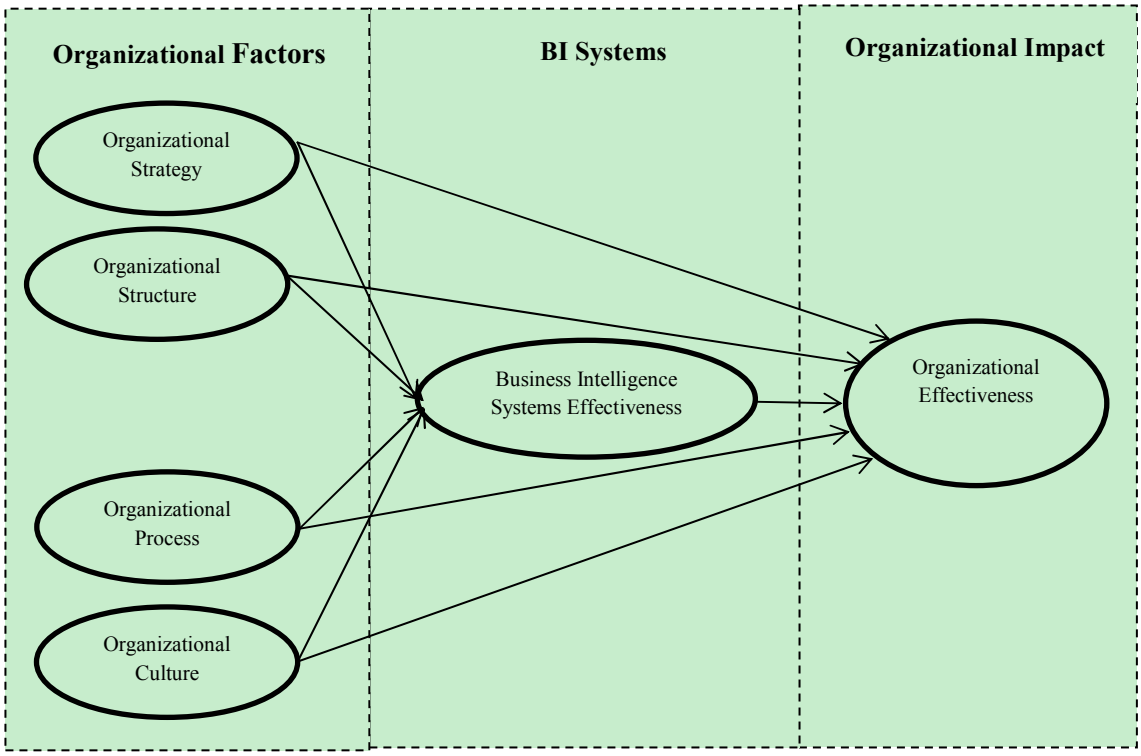


Figure 1: Theoretical Model

Business Intelligence and organizational effectiveness

Business intelligence is one of the most widely searched terms and remains a topic of interest in both industrial and academic communities (Işık et al., 2013). It is a set of technologies which collect and analyze the data to improve work-flows and organization decision-making (Herschel and Jones, 2005). It is the combination of collecting, cleaning and integrating data from different sources, and presenting results that can improve business decisions making (Akram, 2011). There is a large volume of published studies describing the role of business intelligence on organizational effectiveness. Watson and Wixom (2007) found that business intelligence includes the critical functions that help an organization improve both its performance and

adaptation to change. To date, BI applications have focused on managing strategic and tactical business plans and initiatives. Organizations have been using BI to monitor, analyze, report, and improve the performance of its business operations (White, 2005). BI helps organization to optimize business performance. It assists corporate managers and decision makers to make accurate, timely and relevant decision in an organization and thus lead to the increases of productivity and profitability of an organization (Olaru, 2014). Turban et al. (2007) revealed that BI improves business organization's effectiveness. It gives an organization's suppliers, partners, and employees the easy access to the information and the ability to analyze and share the information with others. Based on these arguments, it is hypothesized that:

H1: There is a positive relationship between business intelligence systems and organizational effectiveness.

Organizational factors and BI systems

The resourced-based view has been studied mostly to identify the relationship between organizational resources and its impact on value creation (Barney, 1991). A resource-based view explains how organizational resources that are rare, valuable, and inimitable, generate sustainable competitive advantages for firms. Organizational resources cover a wide range of valuable assets controlled by the organization, including management skills, organizational strategy, culture, processes, structure, firm attributes, which enables the firm to utilize and ensure enhanced performance (Daft, 1983; Barney, 1991). Researchers have argued for the application of resource-based view of achieving firms' long term success by measuring the strategic value of IT resources (Wade and Hulland, 2004). Furthermore, a fit among organizational resources depends on the best possible organizational design that is contingent upon numerous internal and

external factors. Based on contingency theory, previous studies, further, argued for the importance of fit among subsystems of the organization and the factors such as technology, people, information, strategy, culture, process and structure which ensures ultimate long term firm performance (Tosi and Slocum, 1984). On the other words, the organizational factors are viewed as non-IT resources, subsystems of a firm, and complementary to IT resources (Wiengarten, Humphreys, Cao, and McHugh, 2013). In line with both resource-based view and contingency approaches, it is proposed that organizational factors, such as organizational strategy, structure, culture and process, impact BI systems' effectiveness that ultimately affects firm's effectiveness.

Organizational Strategy

BI systems cannot work in isolation; instead, it takes organizational factors to make the organization effective with enhanced performance. The relationship between organizational strategy and BI systems utilization is crucial, thus demands keen attention of top managers. According to Daft (1995, p. 49), "organizational strategy is a plan for interacting with the competitive environments to achieve organizational goals. Organizational performance largely depends on the sound strategy and its effective implementation".

This study followed Venkatraman's (1989) STROBE (Strategic Orientation of Business Enterprise) framework to analyze organizational strategy. Although the framework elucidates six dimensions to represent organizational strategy, we adopted the revised dimensions examined by Bergeron et al. (2004) where they validated four dimensions such as analysis, defensiveness, futurity and pro-activeness. Analysis refers to the capability of problem solving through extensive searching with identification of root-causes and best potential results (Miller and Friesen, 1983). By taking conservative measures such as cost reduction and making organization efficient, the defensive behavior can be demonstrated through defensiveness dimension. Futurity

dimension defines the simultaneous emphasis on decision making by considering cost efficiency at present and in the future as well as strength in the long run. Pro-activeness demonstrates to be one step ahead to tap the opportunities such as business diversification with new industries, and continuous searching for market opportunities and exploitation of strengths to become pioneer. Once these four dimensions are incorporated, organizations are more likely to have strategic directions that lead to better performance.

The link between organizational strategy and BI systems' effectiveness is obvious. One of the major objectives of the BI systems application is to provide useful and timely information so that top management can make valuable decision guiding organization to achieve success. A core alignment between business strategy and IT strategy is desirable for sound organizational performance. While high-performing firms ensure the strategic IT alignment (Chan et al., 1997), researches reveal that low-performing firms are more likely to face paradoxical position, having poor alignment of business strategy and structure with IT strategy and structure (Bergeron et al., 2004). Although some researchers have argued for strategic IT alignment that depends on the contextual factors such as industry, environmental uncertainty (Kearns and Lederer, 2004; Armstrong and Sambamurthy, 1999), knowledge sharing culture, and prior IS success (Chan et al., 2006); a growing body of researches have demonstrated the role of mediation between organizational strategy focusing on IT capabilities and organizational effectiveness (Bergeron et al. 2001). With this line of argument, we posit that BI systems' effectiveness mediates the relationship between the organizational strategy and organizational effectiveness. Thus, we propose the following hypotheses:

H2: Organizational strategy (analysis, defensiveness, futurity, and proactiveness) will have a positive relationship with BI systems' effectiveness.

H3: Organizational strategy (analysis, defensiveness, futurity, and proactiveness) will have a positive relationship with organizational effectiveness.

H4: BI systems' effectiveness mediates the relationship between organizational strategy and organizational effectiveness.

Organizational structure

Organizational structure is one of the important organizational factors that constitute a congenial environment for BI systems' success. Organizational structure is defined as the pattern of relationships, authority, and internal communication among members and tasks (Thompson, 1967). Structure is consisted with some common variables such as centralization, formalization, vertical and horizontal differentiation, administrative intensity, and professionalization (low complexity). In spite of these scales with different depth and breadth, the common goal of its application is to know the extent to which the administrative decision-making authority is dispersed to hierarchical roles and positions. Although the previous studies varied in measuring organizational structure, most of them emphasized centralization and decentralization as the important features to know how much organization is flexible regarding its tasks and activities. Centralization refers to the degree to which the authority for making a decision is controlled by the organization (Fry and Slocum, 1984). A high degree of authority is expected to execute the decision and implementation, on the other hand, decentralized authority is effective to have organizational innovation (Daft, 1978). A numerous study have suggested that decentralized structure ensures employee's satisfaction and motivation, flexibility in decision making, prompt decision and execution, vertical communication, stability in external environmental changes, and higher efficiency (Sewar and Werbel, 1979; Burns and Stalker, 1961; Schminke et al., 2000; Daft, 1978).

Research has found a positive link between decentralized organizational structure and its alignment with firm's performance and innovation (Evans and Davis, 2005). It is obvious that decentralized structure increases the frim's performance. In a decentralized structure, effective decisions are taken and implemented promptly at the process level that in turn ensures firm's performance (Andersen and Segars, 2001). BI systems are seemed to be effective and affect firm's performance in decentralized structure, by which process, customer, suppliers oriented information is communicated to top authority without any hurdle and delay. Therefore, the following hypotheses can be formulated.

H5: Organizational structure (decentralization) will have a positive relationship with BI systems' effectiveness.

H6: Organizational structure (decentralization) will have a positive relationship with organizational effectiveness.

H7: BI systems' effectiveness mediates the relationship between organizational structure and organizational effectiveness

Organizational Process

Organizational process (management process) entails IT, marketing, manufacturing, and supply chain management processes. Research reveals that the complementary between marketing and IT, manufacturing and supply chain management processes positively affects firm's performance (Bharadwaj et al., 2007). Moreover, the integration of these complimentary effects and firm's IS capability mutually affect firm's operational performance and enhance organizational effectiveness (Bharadwaj et al., 2007). Similarly, when organizational process (management process) is aligned with IT infrastructure, an organization may experience IT-based capabilities

or competencies that lead to enhanced process performance and firm performance (Nevo and Wade, 2010). Furthermore, IT-process alignment builds a strong capability which brings firm's sustained competitive advantage (Wade and Hulland, 2004; Wiengarten et al., 2013).

When information system is associated and incorporated with organizational processes, a synergistic effect is generally seen that enhances organizational capabilities. For instance, knowledge processes and management processes with aligned information systems generate the organizational capabilities that determine organizational effectiveness (Radhakrishnan et al., 2008). Most importantly, BI systems sometimes require redesign of processes to meet the IT infrastructure to specific organizational processes. An integrated customer and supplier processes help firms to process supplier and customer oriented information that increases firms' capability to exchange information quickly and firm's financial performance (Barua et al., 2004). BI systems initiate and incorporate the firm's IT, customer, supplier, manufacturing capabilities to accentuate the operational procedures. The linkage between BI enabled organizational processes and organizational effectiveness is depended on appropriate utilization of BI systems in the organization. Therefore, we assume that organizational process, consistent with BI systems, impacts firms' effectiveness through the effective BI systems, and it comes out the hypotheses below.

H8: Organizational process (management process) will have a positive relationship with BI systems' effectiveness.

H9: Organizational process (management process) will have a positive relationship with enhanced organizational effectiveness.

H10: The association between organizational process (management process) and enhanced organizational effectiveness is mediated by the effectiveness of BI systems.

Organizational culture

Organizational culture is defined as "the pattern of shared values and beliefs that helps individuals understand organizational functioning and thus provides them with the norms for behavior in the organization" (Deshpande and Webster, 1989, p. 4). Schein (1985) emphasized on "shared assumptions" held by employees in an organization. While researchers are not in consensus on which dimension(s) represent(s) organizational culture, we follow the work of Denison and his colleagues (Denison, 1990; Denison and Mishra, 1995; Denison and Neale, 1996; Fey and Denison, 2003) who postulated four dimensions of organizational culture such as adaptability, consistency, involvement, and mission. Adaptability refers to the extent to which an organization can cope with the external environment by changing behavior, structures, and systems. Consistency is defined as the extent to which an organization has the ability to sustain a shared values, beliefs, and norms among organizational employees. Involvement refers to the extent to which an organization allows its members to participate in decision making. Mission refers to a clear and meaningful explanation of organizational purposes that is shared by all members in an organization.

Organizational culture is empirically related to organizational effectiveness, and conducive and solid organizational culture motivates employees to achieve organizational success. Moreover, organizational culture brings a sustained competitive advantage that is difficult to imitate. Information systems research has identified the positive relationship between firm's culture and organizational performance. Organizational culture does not impact organizational effectiveness directly, rather it needs people to be influenced and guided to achieve the organizational goals. In the milieu of organizational volatility, both structured and unstructured

information lies within and beyond the boundary of the organization and such information exploration would be captured by the employees of organization In an organization with strong and conducive organizational culture, members' capability to digest information from unknown world is enhanced that leads to make constructive and effective decisions. Organizational culture (involvement, consistency, adaptability, and mission) is related to organizational effectiveness such that involvement, consistency, adaptability, and mission shape the organization in such a way it is likely to contribute to enhanced organizational effectiveness.

BI systems continuously focus on new information searching by utilizing all channels of data gathering, using information system mechanisms to synthesize and convert the data into useful information, monitoring all operational processes and tracking root-cause of the problems. BI systems' effectiveness leads to organizational effectiveness, conditioning the antecedent role of organizational culture. Because, shared perceptions, values, norms, and beliefs held by organizational members provide a conducive and enduring environment, having free flow of information of suppliers and end customers among organizational hierarchies and different operational departments, such that the organization is benefited through prompt decision implementation, problem minimization, and heightening performance. Therefore, the hypotheses are developed as follows.

H11: Organizational culture (involvement, consistency, adaptability, and mission) will have a positive relationship with BI systems' effectiveness.

H12: Organizational culture (involvement, consistency, adaptability, and mission) will have a positive relationship with enhanced organizational effectiveness.

H13: BI systems' effectiveness mediates the relationship between organizational culture and organizational effectiveness.

Research Methodology

Data Collection

A quantitative survey was designed and conducted in Bangladesh, one of the emerging countries in South Asia. This study targeted senior managers who took initiative to act out and enforce the business intelligence systems, such as chief executing officers, managers of IT, managers of MIS, system analysts, HR managers and business managers. These professionals were chosen as the respondents because they have vast knowledge of organizational characteristics, BI systems, and its impact on firm's effectiveness.

We compiled a list of firms that had adopted BI systems from a prominent BI software vendor with an agreement of maintaining privacy. These firms have been utilizing technologies to advance business performance for at least ten years in its respected sectors. A contact list, including mailing, email address and telephone number of each client was collected from the selected vendor. Strategic business units (SBUs) operating under a group of establishment were also emphasized similarly as with the parent organization.

A total of 587 managers in 363 organizations were selected based on the BI software adoption and the length of usage. Multiple respondents were selected from a large organization if the respondents hold managerial positions in IT, MIS, and HR departments to reduce the bias. In a small organization, top managers such as chief executing officer and managers of MIS were chosen as information providers of BI systems and organizational factors.

All items were originally in English. Following the translation-back translation procedure (Brislin, 1980), the items were translated into Bengali. Two bilingual professors who taught MIS at university level in English and Bengali proficiencies were requested to check the translated items. With minor corrections, the revised items were sent to the five selected IT and MIS managers to match their understanding of the items. Some alterations were performed to get the final version of the translated items. Prior to the main survey, we conducted a pilot study of 23 selected managers to ascertain that the questionnaire items fit well to the research objectives. According to the results of this pilot study, the consistency was ensured and revision of the items was happened to make sure the conciseness, understandability without redundancy of the items.

A structured questionnaire was prepared for targeted managers. Following the proposition of Dillman (2000), we sent a package including a cover letter, a questionnaire, and reply-paid envelope to the recipients through the mail. Along with the mail, an email was sent to each respondent, including a cover letter and a questionnaire to make sure the convenience of giving responses. After four weeks of mailing out, an email was sent to respondents requesting to post back the filled questionnaire. The respondents who failed to respond were given both email and the paper package again after the expiry of another four weeks. Two weeks later, a final request was delivered to remaining recipients who did not respond to the survey. In line with the previous studies (Dillman, 2000; Chatterjee et al., 2002), we found no significant difference between on-line and paper based survey.

A total of 302 respondents from 168 organizations sent their responses. Among the respondents, 43 participants responded on-line. On an average, 2 managers of a single organization responded. Managers representing a strategic business unit were asked to respond on behalf of either strategic business units or their parent organizations.

After checking the responses, 14 questionnaires were found with considerable missing information (50% or more), and thus were discarded from the survey. A usable sample of 288 respondents from 154 organizations was finally obtained. 71 respondents provided information on behalf of their SBUs, which was used to match other informants from the same SBU. 63 organizations were holding two or more informants. Therefore, the total sample of organizational unit became 225 by adding SBUs with the list of organizations.

Following the procedure described by Armstrong and Sambamurthy (1999), we averaged the multiple respondents of each organization on the main variables of the sample and conducted the correlation among the responses. We found a high average correlation (0.48, $p < 0.05$) among the responses provided by respondents of each organization. Thus, the results provided support of the consistency between multiple respondents of each organization. On the other hand, a single informant from an organization was treated as the representative of the organization. Moreover, we found no significant difference between individual and average responses.

The responses represented vast categories of industries in the sample (Table 1). The dominant organizations in the sample are from manufacturing industry (54%); was followed by banking, insurance, and financial industries (21%), and then hospitality, hotel, and tourism industry (17%). A least sample (8%) is representing retail, wholesale, and distribution industry. The average size of the firm is large with an average of 558 employees.

Table 1: Breakdown of respondents

Descriptions		Frequency	Percentage (%)
Gender	Male	187	83
	Female	38	17
Age	30-34	16	7
	35-39	63	28
	40-44	105	47
	45-49	34	15
	50+	7	3
Industry	Manufacturing	122	54
	Banking, Insurance and Financial	46	21

	Tourism	39	17
	Retail	18	8
Position in Organization	Business Executives	108	48
	IT executives	83	37
	Both Business and IT	34	15
BI systems experience	2-4 years	41	18
	5-7years	119	53
	More than 7 years	65	29

The respondents were dominated by males (83%) , while females represented very few (17%) with an average age of 43 years old, and the averaged duration of relevant work experience was 13.4 years. Most respondents (48%) were representing themselves as business executives, while 37% were IT executives, with 15% holding business and IT jobs simultaneously. 53% of the total respondents held experienceon BI systems at least 5 years, while 29% of informants had more than 7 years of experience. Therefore, it represents that the informants have a vast experience on BI systems as well as organizational management. We conducted an ANOVA test (p<0.05) for testing non-response bias. All responses received within the first four weeks were treated as early responses and the rest as late responses. The results show that there are no significant differences between the two samples.

As this study undertook a survey based on self-report on all of the variables, the question of common method bias might arise. In line with the work of Konrad and Linnehan (1995) and Simonin (1997), we conducted Harman's one-factor test of all variables to measure the possible common method bias in our study. The result of principle component factor analysis revealed 6 factors with eigenvalues greater than 1.0, while these factors accounted for 70% of the variance. Moreover, the first factor did not account for the majority of the variance (33%). On the basis of these findings, we can assume that the common method bias is not a concern in this study (Podsakoff and Organ, 1986).

Measurement Items

We adopted the existing items used in previous studies for our research. Because of the length of items, we adjusted the items that match with this study. The construct, items and their sources are listed in Table 2.

Table 2: Measurement Items

Construct	Item	Source
Organizational Effectiveness (5)	OE1: Compared with key competitors, our company is more successful.	Lee and Choi (2003)
	OE2: Compared with key competitors, our company has a greater market share.	
	OE3: Compared with key competitors, our company is growing faster.	
	OE4: Compared with key competitors, our company is more profitable.	
	OE5: Compared with key competitors, our company is more innovative.	
BI Systems Effectiveness (10)	BI1: BIS improved coordination with business partners/suppliers.	Elbashir et al. (2008)
	BI2: BIS reduced the cost of transactions with business partners/suppliers.	
	BI3: BIS improved responsiveness to/from suppliers.	
	BI4: BIS Intelligence improved efficiency of internal processes.	
	BI5: BIS increased staff productivity.	
	BI6: BIS reduced the cost of effective decision-making.	
	BI7: BIS reduced operational cost.	
	BI8: BIS reduced customer return handling costs.	
	BI9: BIS reduced marketing costs.	
	BI10: BIS reduced time-to-market products/services.	
Organizational Strategy (12)	OS1: Emphasize effective coordination among different functional areas	Venkatraman (1989)
	OS2: Information systems provide support for decision making	
	OS3: Manpower planning and performance appraisal of senior managers	
	OS4: Use of cost control systems for monitoring performance	
	OS5: Use of production management techniques	
	OS6: Emphasis on product quality through the use of quality circles	
	OS7: We emphasize basic research to provide us with future competitive edge	
	OS8: Forecasting key indicators of operations	
	OS9: "What-if" analysis of critical issues	
	OS10: Constantly seeking new opportunities related to the present operations	
	OS11: Constantly on the look out for businesses that can be acquired	
	OS12: Operations in larger stages of life cycle are strategically eliminated	
Organizational Structure (5)	ORS1: Any major decision that I don't require this company's approval	Ferrell and Skinner (1988)
	ORS2: In my dealings with this company, no single matter has to be referred to anyone higher up for a final answer.	
	ORS3: My dealings with this company are subject to a lot of rules and procedures stating how various aspects of my job are to be done (R)	
	ORS4: I don't have to ask company representatives before I do anything in my business	
	ORS5: I can take very little action on my own until this company or its representatives approve it (R)	
Organizational Process (5)	OP1: Project management rules and procedures formalized via documents such as contract books, sign-off forms, and such.	Tatikonda and Montoya-Weiss (2001)
	OP2: Formal project management rules and procedures actually followed.	
	OP3: Formal progress reviews held (sometimes also called design, gate, phase, or stage reviews).	
	OP4: Technology enabled organizational processes to perform well	
	OP5: Strategic planning process actually encourages information sharing and cross-functional cooperation.	
Organizational	OC1: Most people in this company have input into the decisions that affect	Denison and

Culture (8)	them.	Mishra (1995)
	OC2: Cooperation and collaboration across functional roles is actively encouraged.	
	OC3: There is a high level of agreement about the way that we do things in this company.	
	OC4: Our approach to doing business is very consistent and predictable.	
	OC5: Customers' comments and recommendations often lead to changes in this organization.	
	OC6: This organization is very responsive and changes easily.	
	OC7: This company has a long-term purpose and direction.	
	OC8: There is a shared vision of what this organization will be like in the future.	

Data Analysis

We used structural equation modeling (SEM) in order to analyze the data and test the hypothesized model. SEM is an important and effective statistical tool that integrates factor analysis (using a measurement model) and path analysis (using a structural model). SEM analyzes all hypothesized relationships simultaneously. Specifically, we conducted a confirmatory factor analysis (CFA) to assess the reliability and validity of the constructs and tested the structural fit of our theoretical model. We applied partial least squares (PLS) in version of Smart PLS 2.0 (Ringle et al., 2005) to analyze the data collected. The following section presents the results of the measurement model estimation and elucidates the hypothesized results of the research model exposed in figure 1.

Results

Measurement model evaluation

We tested a measurement model at the item level to check whether scale items were adequate indicators of their underlying constructs. The measurement model revealed six latent constructs (i.e., organizational effectiveness, BI systems' effectiveness, organizational strategy, organizational structure, organizational process, and organizational culture).

The internal consistency statistics were assessed by Cronbach's alpha and composite reliability (CR) (Dillon Goldstein's Rho), which were represented in table 3. Both the Cronbach's alpha and CR of all constructs were above the threshold of 0.7. Therefore, all the items used in this study were found reliable. We proceeded to test the construct validity by measuring average variance extracted (AVE), which measures the percentage of the variance captured by a construct by showing the ratio of the sum of the variance captured by the construct and measurement variance. Table 3 shows that the AVE of each construct was greater than a threshold of 0.5 (Yoo and Alavi, 2001).

Table 3: The Measurement Model

	AVE	Composite Reliability	Cronbach's Alpha
BIS	0.6519	0.9493	0.9406
OE	0.5723	0.8693	0.8120
OC	0.7946	0.9687	0.9631
OP	0.7302	0.9312	0.9078
OS	0.6732	0.9611	0.9559
OST	0.6889	0.9170	0.8876

Note: AVE: average variance extracted; BIS: Business intelligence systems; OE: Organizational effectiveness; OC: Organizational culture; OP: Organizational process; OS: Organizational strategy; OST: Organizational structure.

Further, we tested the discriminant validity examining whether a construct better explains the variance of its own indicators than the variance of other constructs. The correlations estimated between every two constructs were from 0.14 to 0.61. Table 4 illustrates that the square root of the AVE of each construct，representing in the diagonal positions, was higher than the entries in the corresponding rows and columns. Hence, the results support the discriminant validity of all constructs in the hypothesized model.

Table 4: Correlation matrix and square root of the AVE

	BIS	OE	OC	OP	OS	OST
BIS	**0.8074**					
OE	0.6067	**0.7565**				
OC	0.3492	0.4224	**0.8914**			

OP	0.4296	0.4531	0.2439	**0.8545**		
OS	0.4622	0.5797	0.2884	0.3293	**0.8205**	
OST	0.2775	0.3048	0.1483	0.2507	0.1569	**0.8300**

Note: BIS: Businesss intelligence systems; OE: Organizational effectiveness; OC: Organizational culture; OP: Organizational process; OS: Organizational strategy; OST: Organizational structure. The principal diagonal of the correlation matrix represents the square root of the average variance extracted (AVE) per construct.

Finally, we tested the convergent validity using the factor and cross loading of all indicator items in relation to their respective latent constructs. In table 5, cross loadings of all items showed that the measurement items loaded highly on their respective constructs and did not load highly on other constructs. Moreover, the results revealed that all items loaded on their respected constructs with a factor between 0.65 and 0.91. Thus, we can affirm that these measurement items accurately represent distinct latent constructs.

Table 5: The cross-loading matrix

	BIS	OC	OE	OP	OS	OST
BIS1	**0.8151**	0.2857	0.5373	0.3699	0.4400	0.2973
BIS2	**0.8246**	0.3309	0.4768	0.3192	0.3547	0.2415
BIS3	**0.8168**	0.3646	0.4479	0.3475	0.2928	0.1594
BIS4	**0.7863**	0.2732	0.4263	0.3004	0.3416	0.2649
BIS5	**0.7981**	0.3270	0.4882	0.3719	0.3686	0.2744
BIS6	**0.8528**	0.2839	0.5689	0.3700	0.4172	0.1984
BIS7	**0.7737**	0.2391	0.5013	0.3433	0.4002	0.1692
BIS8	**0.7960**	0.2260	0.4995	0.3715	0.3545	0.2407
BIS9	**0.7893**	0.2031	0.4514	0.3286	0.3468	0.1782
BIS10	**0.8187**	0.2844	0.4676	0.3357	0.3777	0.1883
OC1	0.3355	**0.8877**	0.3617	0.2032	0.2314	0.1664
OC2	0.3188	**0.9112**	0.3866	0.2041	0.2591	0.0888
OC3	0.2771	**0.8832**	0.3623	0.1960	0.2223	0.1287
OC4	0.2671	**0.8728**	0.3594	0.1810	0.2364	0.1417
OC5	0.3198	**0.9022**	0.3794	0.1843	0.2691	0.1500
OC6	0.3177	**0.9061**	0.4053	0.2479	0.3011	0.1028
OC7	0.2938	**0.8938**	0.3735	0.2799	0.2848	0.1547
OC8	0.3445	**0.8737**	0.3832	0.2391	0.2507	0.1306
OE1	0.4712	0.2963	**0.7397**	0.3476	0.4289	0.2184
OE2	0.4520	0.3148	**0.7715**	0.3774	0.4559	0.2551
OE3	0.4661	0.3567	**0.7837**	0.3372	0.4565	0.2920
OE4	0.5325	0.3422	**0.8227**	0.3700	0.4805	0.2097
OE5	0.3505	0.2868	**0.6552**	0.2725	0.3625	0.1808
OP1	0.3899	0.1749	0.3699	**0.8545**	0.2688	0.1991

OP2	0.3777	0.2289	0.3495	**0.8607**	0.2470	0.2498
OP3	0.3692	0.2587	0.3764	**0.8416**	0.2566	0.1727
OP4	0.3817	0.1990	0.4423	**0.8718**	0.3484	0.2636
OP5	0.3052	0.1778	0.4007	**0.8437**	0.2866	0.1869
OS1	0.3539	0.2087	0.4690	0.2448	**0.7861**	0.1442
OS2	0.4354	0.2039	0.4752	0.2479	**0.8141**	0.1441
OS3	0.3345	0.2030	0.4164	0.2238	**0.8264**	0.0998
OS4	0.3378	0.2275	0.4741	0.2816	**0.8269**	0.0919
OS5	0.4002	0.2009	0.4968	0.3020	**0.8303**	0.1484
OS6	0.3824	0.2820	0.4764	0.2145	**0.8230**	0.1962
OS7	0.4131	0.2529	0.4970	0.2902	**0.8595**	0.1589
OS8	0.3138	0.2660	0.4438	0.2278	**0.8272**	0.1260
OS9	0.4279	0.2605	0.4513	0.3076	**0.8142**	0.0790
OS10	0.3573	0.1918	0.4823	0.2900	**0.8004**	0.1790
OS11	0.3658	0.2506	0.4977	0.2916	**0.8115**	0.0527
OS12	0.3864	0.2899	0.5161	0.3050	**0.8250**	0.1294
OST1	0.2209	0.1330	0.2899	0.2289	0.1627	**0.8143**
OST2	0.2149	0.0528	0.2124	0.1845	0.1205	**0.8308**
OST3	0.2697	0.1405	0.2573	0.1905	0.1126	**0.8712**
OST4	0.2648	0.1697	0.2878	0.2414	0.1462	**0.8612**
OST5	0.1480	0.1031	0.2090	0.1965	0.1069	**0.7704**

Structural model assessment

The structural model is examined by incorporating the estimation of the path coefficients and the variance explained R^2 values. Specifically, we measured all the relationships of the hypothesized model by describing unmediating and mediating relationships separately. Moreover, bootstrapping (5000 resamples) generates coefficient and t-statistics.

Unmediated model

Table 6 describes the unmediated structural model with the variance explained (R^2) and the path coefficients of all the constructs. We found that organizational strategy ($\beta = 0.4177$, t-statistic = 4.8076, $p < 0.01$), organizational structure ($\beta = 0.1559$, t-statistic = 2.4963, $p < 0.01$), organizational process ($\beta = 0.2217$, t-statistic = 3.0731, $p < 0.01$), and organizational culture ($\beta = 0.2171$, t-statistic = 3.1436, $p < 0.01$), positively affected organizational effectiveness. Thus, the

results support the hypotheses 3, 6, 9, and 12. The R^2 for BI systems' effectiveness was 0.351, indicating that the variation in the organizational factors explained 35.1% of the total variance of BI systems' effectiveness. Moreover, BI systems' effectiveness significantly affects organizational effectiveness (β = 0.6180, t-statistic = 7.6298, $p < 0.001$). Thus, the results support the hypothesis 1. The R^2 for organizational effectiveness was 0.486, indicating that the variation in the organizational factors explained 48.6% of the total variance of organizational effectiveness.

Table 6: The summary of the results of the unmediated model

Effect	Coefficient	t-Statistics	Conclusion
Organizational Strategy → Organizational Effectiveness	0.4177	4.8076	Supported
Organizational Structure → Organizational Effectiveness	0.1559	2.4963	Supported
Organizational Process → Organizational Effectiveness	0.2217	3.0731	Supported
Organizational Culture → Organizational Effectiveness	0.2171	3.1436	Supported
Business Intelligence Systems → Organizational Effectiveness	0.6180	7.6298	Supported

Mediated model

Table 7 describes the mediated structural model with the variance explained (R^2) and the path coefficients of all the constructs. Consistent with the unmediated model, we found that organizational strategy (β = 0.3019, t-statistic = 4.2661, $p < 0.01$), organizational structure (β = 0.1394, t-statistic = 2.1952, $p < 0.01$), organizational process (β = 0.2537, t-statistic = 3.6772, $p < 0.01$), and organizational culture (β = 0.1800, t-statistic = 3.1603, $p < 0.01$), had a positive and significant impact on BI systems' effectiveness. Thus, the results support the hypotheses 2, 5, 8 and 11. It is noteworthy that after controlling BI systems' effectiveness, organizational strategy (β = 0.3702, t-statistic = 4.2571, $p < 0.01$), organizational structure (β = 0.1354, t-statistic = 2.1815, $p < 0.01$), organizational process (β = 0.1422, t-statistic = 2.2164, $p < 0.01$), and organizational culture (β = 0.1714, t-statistic = 2.4125, $p < 0.01$) still kept their direct impacts on organizational effectiveness. In addition, BI systems' effectiveness significantly affects

organizational effectiveness (β = 0.3920, t-statistic = 4.5927, $p < 0.01$), which is essential to represent the mediating role with the organizational factors. Thus the results support the hypotheses 4, 7, 10 and 13. R^2 for organizational effectiveness was 0.50, which is greater than 0.486 found in the unmediated model. The increased value of the variance explained (R^2) of the mediated model over unmediated model indicates that the mediated model has a better fit than the original model.

Table 7: The summary of the results of the mediated model

Effect	Coefficient	T-Statistics	Conclusion
Organizational Strategy → Business Intelligence Systems	0.3019	4.2661	Supported
Organizational Strategy → Organizational Effectiveness	0.3702	4.2571	Supported
Organizational Structure → Business Intelligence Systems	0.1394	2.1952	Supported
Organizational Structure → Organizational Effectiveness	0.1354	2.1815	Supported
Organizational Process → Business Intelligence Systems	0.2537	3.6772	Supported
Organizational Process → Organizational Effectiveness	0.1422	2.2164	Supported
Organizational Culture → Business Intelligence Systems	0.1800	3.1603	Supported
Organizational Culture → Organizational Effectiveness	0.1714	2.4125	Supported
Business Intelligence Systems → Organizational Effectiveness	0.3920	4.5927	Supported

Following the procedure of Baron and Kenny (1986), we further attempted to examine the mediation effect of BI systems' effectiveness. Table 8 depicts the results of the mediation hypotheses. We used the Sobel test (Sobel, 1982) to identify the significance level of the indirect effects. The outcomes indicated that the test statistic for organizational structure (z = 2.12, $p <$ 0.05), organizational strategy (z = 3.15, $p < 0.01$), organizational culture (z = 2.49, $p < 0.05$), and organizational process (z = 2.66, $p < 0.01$) predicted BI systems' effectiveness as a significant mediator.

Table 8: Summary of the results for mediation effect.

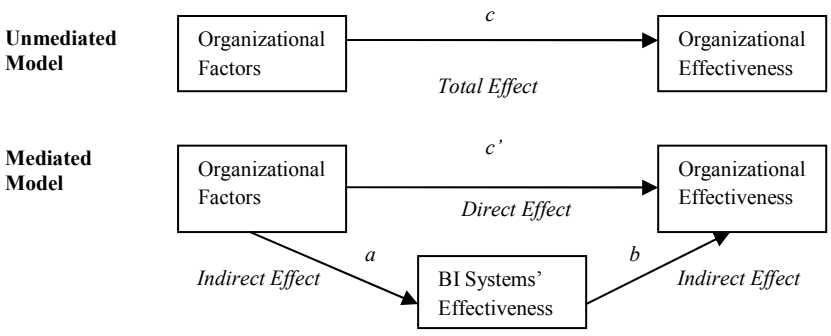
Organizational factors	Path	Path coefficient	S.E	t-test	Sobel test	Mediation Type
Organizational Strategy	c	0.418	0.087	4.808^{***}	z=3.15 (p< 0.01)	Partial
	a	0.302	0.071	4.266^{***}		
	b	0.392	0.086	4.593^{***}		

	c'	0.370	0.089	4.257^{***}		
Organizational Sturcture	c	0.156	0.061	2.496^{**}	z=2.12 (p< 0.05)	Partial
	a	0.139	0.063	2.195^{**}		
	b	0.392	0.086	4.593^{***}		
	c'	0.135	0.064	2.182^{**}		
Organizational Culture	c	0.217	0.072	3.144^{***}	z=2.49 (p< 0.05)	Partial
	a	0.180	0.057	3.160^{***}		
	b	0.392	0.086	4.593^{***}		
	c'	0.171	0.071	2.413^{**}		
Organizational Process	c	0.2217	0.073	3.073^{***}	z=2.66 (p< 0.01)	Partial
	a	0.254	0.068	3.677^{***}		
	b	0.392	0.086	4.593^{***}		
	c'	0.142	0.067	2.216^{**}		

Note: $^{**}p < .01.$ $^{***}p < .001.$

As figure 2 shows, all organizational factors initially have a significant total effect on organizational effectiveness. When introducing BI systems' effectiveness as a mediator, all organizational factors still have a significant direct effect on organizational effectiveness. The results suggest that BI systems' effectiveness partially mediates the influence of all organizational factors on organizational effectiveness.

Figure 2. The total effect vs. direct effect vs. indirect effect.



Discussion

Overall, the study provides empirical evedence for the hypotheses proposed in the research. This study found strong positive relationship between BI systems' effectiveness and organizational effectiveness. This finding is consistent with past studies which support the facts that

organizational effectiveness is influenced by BI systems' effectiveness (Elbashir et al., 2008). In the unmediated model, we found that organizational factors such as organizational strategy, organizational structure, organizational process, and organizational culture have positive effect on organizational effectiveness. Our findings are consistent with the results of previous studies on the relationship between organizational factors and organizational effectiveness (Hansen and Wernerfelt, 1989; Angle and Perry, 1981).

Organizational strategy has a significant impact on organizational effectiveness above and beyond that of organizational context (Zheng et al., 2010). The contingency theories of organization indicate that different types of organizational structures are appropriate for different types of situations. Duncan (1973) found that different organizational structures were related to the decision unit's effectiveness and organizational effectiveness. The culture can be studied as an important part of the adaptation process of organizations and that specific culture may be useful predictors of performance and effectiveness of the organization (Denison and Mishra, 1995).

In the mediated model, it was confirmed that business intelligence systems' effectiveness partially mediates organizational strategy, organizational structure, organizational process, and organizational culture's influence on organizational effectiveness. This finding suggests that how well business intelligence is managed is largely associated with how well strategy, structure, process, and cultural values are translated into values to the organization. It seems that a logical next step in research on strategy, structure, process, culture and effectiveness could proceed to a deeper level by examining the specific mechanism(s) through which organizational factors influence organizational performance. The findings of this study also strengthen the call for attention to creating a strong organizational strategy, decentralized structure, process, and organizational culture that are conducive to implement BI systems.

Managerial Implications

The results of the present study indicate that BI systems are likely to have a positive impact on organizational effectiveness, when there is a close match between BI systems and organizational strategy, structure, culture, and process. The influences of these organizational contextual resources ensure better environmental fit, alignment of organizational resources, and ultimate firm performance. Although organizational and BI systems' effectiveness display the deficiencies in operational performance occurred in process level, the problem may lie in the internal environment level, which is crucial for BI systems' utilization. This study sheds light on the friendly environment of BI systems that is consisted with a perfect match among organizational strategy, structure, culture, and process.

While the pervasive role of BI systems has accentuated by increasing operational, supply chain, and customer service performance in recent years, the utmost influence of BI systems is to facilitate strategic decision-making. The results indicate that organizational strategy has the highest impact on BI systems' effectiveness in comparison with the other organizational factors. It is obvious that aligning organizational strategy with BI systems is the most critical to organizational success. The numerous acceptability and utilization of the BI systems also reflect the strategic soundness of the organization that touches every stage of business process beginning from suppliers to satisfying the end customers.

BI systems' success varies in terms of firm, industry, the size of the firm, while any failure in utilization of BI systems demonstrates that the problem lies in not only the operational level, but also the core level of business such as structure, strategy, culture, and process. To achieve successful change initiatives, the concentration should be paid in how organizational factors can be aligned with organizational demands and activities. This alignment meets success when the

change initiatives are taken through focusing equal consideration in diagnosing process level and organizational factor level deficiencies.

The study has found the simultaneous impact of organizational factors on BI systems, such that organizational strategy, structure, culture, and process act as interdependent systems that influence organizational effectiveness through BI systems. Any change in one or two factors requires a change in the remaining organizational factors. This finding provides new insights, since we addressed the impact of all components of organizational factors on BI systems, rather than one or two components of organizational factors.

Limitations and Future Directions

As like with most researches, the outcomes of this study should be interpreted in light of its limitations. Firstly, the sample of this study is drawn from one single vendor of BI software. Although it ensures the internal validity of the measures, the external validity might be affected if multiple BI software vendors were chosen with different software specifications.

Secondly, a large number of our respondents are the only informants of their organizations. Among 154 organizations, only 63 organizations had multiple respondents. Although responses from single informant as well as managers might overstate or understate the current scenario of the organization, this limitation cannot be overlooked.

Thirdly, the nature of this study is cross-sectional, unless we gathered information on different time frames, we cannot confirm the causality. Further study replicating our hypothesized model with longitudinal data can unfold the causal relationship among variables. Finally, the length of operations in a single industry can give organizations to be matured and benefited from the proper utilization of organizational factors and BI systems as well. Moreover, with the advancement of BI systems and applications of innovative technologies, organizations

can ensure the maximum optimization of the usages. With the passage of time, customization of BI software provided by the vendors, may impact organizational effectiveness and competitive advantage over other firms. Future research can replicate the present study on organizations that are using other BI software provided by other BI vendors.

Conclusion

The primary objective of this study is to identify the impact of organizational factors on BI systems. Although it is concluded that the effective BI systems brings better organizational performance, it is important to unfold the influence of organizational strategy, structure, culture, and process on this relationship. The results reveal that organizational strategy, structure, culture, and process are positively related to BI systems' effectiveness. Furthermore, BI systems' effectiveness partially mediates the relationship between the organizational factors and organizational effectiveness. This study contributes to the present understanding of the relationship between BI systems and organizational effectiveness by incorporating organizational factors as antecedents, such that appropriate and effective organizational factors act as a catalyst to engender the benefits of BI systems.

References

Akram, J. K. (2011). The value of competitive business intelligence system (CBIS) to stimulate competitiveness in global market. *International Journal of Business and Social Science*, *2*(19), 196-203.

Angle, H. L., and Perry, J. L. (1981). An empirical assessment of organizational commitment and organizational effectiveness. *Administrative science quarterly*, 1-14.

Anjariny, A. H., and Zeki, A. M. (2011, November). Development of model for assessing organizations' readiness toward successful Business Intelligence systems. In *Research and Innovation in Information Systems (ICRIIS), 2011 International Conference on* (pp. 1-6). IEEE.

Armstrong, C. P., and Sambamurthy, V. (1999). Information technology assimilation in firms: The influence of senior leadership and IT infrastructures.*Information systems research*, *10*(4), 304-327.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99-120.
Baron, R. M., and Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173-1182.
Barua, A., Konana, P., Whinston, A. B., and Yin, F. (2004). An empirical investigation of net-enabled business value. *MIS Quarterly*, *28*(4), 585-620.
Benders, J., Batenburg, R., and Van der Blonk, H. (2006). Sticking to standards; technical and other isomorphic pressures in deploying ERP-systems. *Information and Management*, *43*(2), 194-203.
Bergeron, F., Raymond, L., and Rivard, S. (2001). Fit in strategic information technology management research: an empirical comparison of perspectives. *Omega*, *29*(2), 125-142.
Bergeron, F., Raymond, L., and Rivard, S. (2004). Ideal patterns of strategic alignment and business performance. *Information and Management*, *41*(8), 1003-1020.
Bharadwaj, S., Bharadwaj, A., and Bendoly, E. (2007). The performance effects of complementarities between information systems, marketing, manufacturing, and supply chain processes. *Information Systems Research*, *18*(4), 437-453.
Brislin, R. W. (1980). Translation and content analysis of oral and written material. In H. C. Triandisand J. W. Berry (Eds.), Handbook of Cross-cultural Psychology, 1, 389-444. Boston: Allynand Bacon.
Businessweek, B. (2011). The Current State of Business Analytics: Where Do We Go from Here?. *Bloomberg Businessweek Research Services* (http://www. sas. com/resources/asset/busanalyticsstudy_wp_08232011. pdf).
Chan, Y. E., Huff, S. L., Barclay, D. W., and Copeland, D. G. (1997). Business strategic orientation, information systems strategic orientation, and strategic alignment. *Information Systems Research*, *8*(2), 125-150.
Chan, Y. E., Sabherwal, R., and Thatcher, J. B. (2006). Antecedents and outcomes of strategic IS alignment: an empirical investigation. *Engineering Management, IEEE Transactions on*, *53*(1), 27-47.
Chatterjee, D., Grewal, R., and Sambamurthy, V. (2002). Shaping up for e-commerce: institutional enablers of the organizational assimilation of web technologies. *MIS Quarterly*, 65-89.
Chau, M., and Xu, J. (2012). Business intelligence in blogs: Understanding consumer interactions and communities. *MIS Quarterly: Management Information Systems*, *36*(4), 1189-1216.
Chen, H., Chiang, R. H., and Storey, V. C. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS quarterly*, *36*(4), 1165-1188.
Cui, Z., Damiani, E. and Leida, M. (2007) 'Benefits of Ontologies in Real Time Data Access', *Digital Ecosystems and Technologies Conference, DEST '07*.pp. 392-397.
Daft, R. (1983). *Organization Theory and Design*. St. Paul, MN: West Publishing.
Daft, R. L. (1995). *Organizational theory and design*. St. Paul: West Publishing.
Davis, M. (2002). Using business intelligence for competitive advantage. *CRM Today*.
Denison, D. R. (1990). *Corporate culture and organizational effectiveness*. John Wiley and Sons.
Denison, D. R., and Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization science*, *6*(2), 204-223.
Denison, D. R., and Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization science*, *6*(2), 204-223.
Denison, D. R., and Neale, W. S. (1996). Denison organizational culture survey. *Ann Arbor, MI: Aviat*.
Deshpandé, R., and Webster Jr, F. E. (1989). Organizational Culture and Marketing: Defining the Research Agenda. *Journal of marketing*, *53*, 3-15.
Dillman, D. A. (2000). Mail and internet surveys: The tailored design method. 2nd ed. New York, NY: John Wiley and Sons, Inc.
Duncan, R. B. (1973). Multiple decision-making structures in adapting to environmental uncertainty: The impact on organizational effectiveness. *Human Relations*.
Elbashir, M. Z., Collier, P. A., and Davern, M. J. (2008). Measuring the effects of business intelligence systems: The relationship between business process and organizational performance. *International Journal of Accounting Information Systems*, *9*(3), 135-153.

Evans, W. R., and Davis, W. D. (2005). High-performance work systems and organizational performance: The mediating role of internal social structure. *Journal of Management*, *31*(5), 758-775.
Evelson, B., McNabb, K., Karel, R., and Barnett, J. (2007). It's time to reinvent your BI strategy. *Intelligent Enterprise*, Forrester Research.
Fey, C. F., and Denison, D. R. (2003). Organizational culture and effectiveness: can American theory be applied in Russia?. *Organization science*, *14*(6), 686-706.
Fry, L. W., and Slocum, J. W. (1984). Technology, structure, and workgroup effectiveness: A test of a contingency model. *Academy of Management Journal*,*27*(2), 221-246.
Hansen, G. S., and Wernerfelt, B. (1989). Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic management journal*, *10*(5), 399-411.
Herschel, R. T., and Jones, N. E. (2005). Knowledge management and business intelligence: the importance of integration. *Journal of Knowledge Management*, *9*(4), 45-55.
IBM (2011). "The 2011 IBM Tech Trends Report: The Clouds are Rolling In...Is Your Business Ready?," November 15 (http://www.ibm.com/developerworks/techntrendsreport; accessed August 4, 2012)..
Işık, Ö., Jones, M. C., and Sidorova, A. (2013). Business intelligence success: The roles of BI capabilities and decision environments. *Information and Management*, *50*(1), 13-23.
Jones, T. E. (2005). Know how managing knowledge for competitive advantage. An Economist Intelligence Unit White Paper. *The Economist*, 1–20.
Jourdan, Z., Rainer, R. K., and Marshall, T. E. (2008). Business Intelligence: An Analysis of the Literature 1. *Information Systems Management*, *25*(2), 121-131.
Kearns, G. S., and Lederer, A. L. (2004). The impact of industry contextual factors on IT focus and the use of IT for competitive advantage. *Information and Management*, *41*(7), 899-919.
Konrad, A. M., and Linnehan, F. (1995). Formalized HRM structures: coordinating equal employment opportunity or concealing organizational practices?.*Academy of Management Journal*, *38*(3), 787-820.
Li, S. T., Shue, L. Y., and Lee, S. F. (2008). Business intelligence approach to supporting strategy-making of ISP service management. *Expert Systems with Applications*, *35*(3), 739-754.
Luftman, J., and Ben-Zvi, T. (2010). Key issues for IT executives 2010: judicious IT investments continue post-recession. *MIS Quarterly Executive*, *9*(4), 263-273.
Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., and Byers, A. H. (2011). Big data: The next frontier for innovation, competition, and productivity, McKinsey Global Institute
Maria, F. (2005). Improving the utilization of external strategic information. Tampere University of Technology, *Master of Science Thesis*.
Miller, D., and Friesen, P. H. (1983). Strategy-making and environment: The third link. *Strategic management journal*, *4*(3), 221-235.
Negash, S. (2004). Business intelligence. *The Communications of the Association for Information Systems*, *13*(1), 54.
Nevo, S., and Wade, M. R. (2010). The formation and value of it-enabled resources: Antecedents and consequences. *Management Information Systems Quarterly*, *34*(1), 10.
Olaru, C. (2014). Business Intelligence in Telecommunications Industry. *International Journal of Economic Practices and Theories*, *4*(1), 89-100.
Olszak, C. M., and Ziemba, E. (2006). Business intelligence systems in the holistic infrastructure development supporting decision-making in organisations. *Interdisciplinary Journal of Information, Knowledge, and Management*, *1*(1), 47-57.
Podsakoff, P. M., and Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of management*, *12*(4), 531-544.
Radhakrishnan, A., Zu, X., and Grover, V. (2008). A process-oriented perspective on differential business value creation by information technology: An empirical investigation. *Omega*, *36*(6), 1105-1125.
Ramakrishnan, T., Jones, M. C., and Sidorova, A. (2012). Factors influencing business intelligence (BI) data collection strategies: An empirical investigation. *Decision Support Systems*, *52*(2), 486-496.
Ranjan, J. (2009). Business intelligence: concepts, components, techniques and benefits. *Journal of Theoretical and Applied Information Technology*, *9*(1), 60-70.
Ringle, C. M., Wende, S., and Will, S. (2005). SmartPLS 2.0 (M3) Beta, Hamburg 2005.

Sahay, B. S., and Ranjan, J. (2008). Real time business intelligence in supply chain analytics. *Information Management and Computer Security*, *16*(1), 28-48.
Schein, E. H. (1985). Organisational culture and leadership: A dynamic view. San Francisco. CA:Jossey-Bass
Simonin, B. L. (1997). The importance of collaborative know-how: An empirical test of the learning organization. *Academy of Management Journal*, *40*(5), 1150-1174.
Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological methodology*, *13*, 290-312.
Thompson, J. (1967). Organizations in Action: Social Science Bases of Administrative Theory. New York: McGraw-Hill.
Tosi, H. L., and Slocum, J. W. (1984). Contingency theory: Some suggested directions. *Journal of Management*, *10*(1), 9-26.
Turban, E., Sharda, R., Delen, D., and Efraim, T. (2007). *Decision support and business intelligence systems*. Pearson Education India.
Vedder, R. G., Vanecek, M. T., Guynes, C. S., and Cappel, J. J. (1999). CEO and CIO Perspectives on Competitive Intelligence. *Communications of the ACM*, 42(8), 108–116.
Venkatraman, N. (1989). Strategic orientation of business enterprises: the construct, dimensionality, and measurement. *Management science*, *35*(8), 942-962.
Wade, M., and Hulland, J. (2004). Review: the resource-based view and information systems research: review, extension, and suggestions for future research. *MIS Quarterly*, *28*(1), 107-142.
Watson, H. J., and Wixom, B. H. (2007). The current state of business intelligence. *Computer*, *40*(9), 96-99.
Watson, H. J., Goodhue, D. L., and Wixom, B. H. (2002). The Benefits of Data Warehousing:
White, C. (2005). The next generation of business intelligence: operational BI. *DM Review Magazine*.
Wiengarten, F., Humphreys, P., Cao, G., and McHugh, M. (2013). Exploring the Important Role of Organizational Factors in IT Business Value: Taking a Contingency Perspective on the Resource-Based View. *International Journal of Management Reviews*, *15*(1), 30-46.
Wixom, B., and Watson, H. (2010). The BI-based organization. *International Journal of Business Intelligence Research (IJBIR)*, *1*(1), 13-28.
Yoo, Y., and Alavi, M. (2001). Media and group cohesion: relative influences on social presence, task participation, and group consensus. *MIS Quarterly*, *25*(3), 371-390.
Zeng, L., Xu, L., Shi, Z., Wang, M. and Wu, W. (2007), 'Techniques, process, and enterprise solutions of business intelligence', *2006 IEEE Conference on Systems, Man, and Cybernetics* October 8-11, 2006, Taipei, Taiwan, Vol. 6, pp. 4722.